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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/563,693

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EXAMINER

CLARK, GREGORY D

ART UNIT

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1786

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/563,693	Applicant(s) FRIOUR ET AL.	
	Examiner GREGORY CLARK	Art Unit 1786	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 March 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The examiner acknowledges the receipt of applicants' arguments dated 03/22/2010.
2. Rejections and objections made in previous office action that do not appear below have been overcome by applicant's amendments and therefore the arguments pertaining to these rejections/objections will not be addressed.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1-13, and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lui (US 6,548,149) in view of Graziano (Canadian Journal of Chemistry 80(4) p. 401-412).**
4. **Regarding Claims 1, 9-10,** Lui discloses an ink recording element formed on a substrate and including a binder and particles of silica prepared by wet method and/or aluminosilicate agglomerated with each other without binder (abstract). Lui further

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discloses that the aluminosilicate can be produced by subjecting a mixture containing, as principal components, aluminum alkoxide and silicon hydroxide for a hydrolysis (controlled) procedure, and are complex products comprising alumina moieties and silica moieties which are closely combined with each other to such an extent that these moieties cannot be isolated from each other. Usually, in the aluminosilicate particles, the alumina moieties (Al_2O_3) and the silica moieties (SiO_2) are contained in a weight ratio (Al/Si) of 1:4 to 4:1, preferably about 6:2 (column 9, lines 44-53). Lui also discloses the ink receiving layer contains specific silica and aluminosilicate colloidal particles (column 16, lines 66-67). Lui fails to mention non-hydrolyzable substituents in silicon alkoxide compounds.

It is well known in the art that hydrocarbon character increases the affinity of a material toward an organic medium. Graziano plots of the standard Gibbs energy change associated with solvation of aliphatic hydrocarbons. The plots shows a negative slope smaller alkanes and a positive slope for higher alkanes which means the solubility of non-polar solutes (materials with hydrocarbon content) increases with the size of the non-polar solute (materials with higher hydrocarbon content) in solvent except water (abstract).

In a medium with more non-hydrolyzable [R group in $\text{RZ}(\text{OR}')_3$ (where Z = Si or Al)] substituents R would be expected to have a greater affinity for solvent-based inks.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to have used hydrolyzable and non-hydrolyzable substituents or blend to

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balance the hydrocarbon character and crosslink density to ultimately control the absorption rate of the receiving layer.

Lui demonstrates that the preparation of aluminosilicate is conducted by hydrolysis and results in a specific ratio range relative to Al/Si. One skilled in the art would conduct such a synthesis to produce the desired ratio similar to the applicant. Lui teaches the preparation of aluminosilicate and its use in ink receiving layers.

Lui fails to mention make the aluminosilicate product by the same process.

Lui teaches the same or a similar aluminosilicate product as the applicant although produced by a different process but used in the same manner in an ink jet element. As the applicant claims an ink jet recording element, the product and not the process is being treated for patentability.

With the expectation of success a person of ordinary skill in the art at the time of the invention would have selected from known methods to make the aluminosilicate product which would have included the process taught by Lui that results in aluminosilicate products similar or obvious to those claimed by the applicant, absent expected results.

5. **Regarding Claims 2-5**, Lui also discloses that the ink receiving layer can contain aluminum oxide, aluminum hydroxide (column 11, lines 22-23), colloidal silica (column 3, line 50), and calcium carbonate (column 11, lines 22-23).

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6. **Regarding Claims 6-7**, Lui discloses that in the ink-receiving there is no limitation to the solid weight ratio of the binder to the silica and/or aluminosilicate pigment particles. Preferably, the binder/pigment ratio is 10:1 to 10:10, more preferably 10:2 to 10:6. If the content of the binder is too high, the resultant ink-receiving layer has a small total volume of pores and thus exhibits unsatisfactory ink absorption.

Lui does not give the exact weight of aluminosilicate in the ink receiving layer-the criteria associated with determining the proper amount is disclosed. Lui shows the awareness in the prior art of the need to add proper amounts of materials to the ink receiving layer by pointing out the unsatisfactory results that can occur when the levels are inappropriate.

Lui discloses the claimed invention except for exact weight of aluminosilicate in the ink receiving layer. It would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust the amount of aluminosilicate in the ink receiving layer, since it has been held that the provision of adjustability, where needed, involves only routine skill in the art. *In re Stevens*, 101 USPQ 284 (CCPA 1954).

7. **Regarding Claim 8**, Lui does not disclose the use of sodium, potassium and lithium hydroxide in the hydrolysis of the aluminum and silicon compounds.

The hydrolysis of metal alkoxide compounds is viewed as known in the art and is generally conducted under basic condition due to the instability of such material to acidic reaction medium. A person of ordinary skill in the art at the time of the invention

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would have full range to use a plethora of basic material to affect controlled hydrolysis which would include sodium, potassium or lithium hydroxide.

8. **Regarding Claims 11-13**, Lui discloses an ink recording element formed on a substrate and including a binder and particles of silica prepared by wet method and/or aluminosilicate agglomerated with each other without binder (abstract). Lui further discloses that the aluminosilicate can be produced by subjecting a mixture containing, as principal components, aluminum alkoxide and silicon hydroxide for a hydrolysis (controlled) procedure. (column 9, lines 44-53). Lui fails to mention non- hydrolyzable substituents on the silicon or aluminum compounds.

It is known in the art that hydrocarbon character increases the affinity of a material toward an organic medium and the crosslink density of a medium effect the porosity of the medium. In a medium with more non- hydrolyzable [R group in $RZ(OR')_3$ (where Z = Si or Al)] substituents R would be expected to have a greater affinity for solvent based inks and a lower crosslink density than a medium with more hydrolyzable substituents. The balance of hydrocarbon character and crosslink density would ultimately control the absorption rate of the receiving layer.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to have used hydrolyzable, non-hydrolyzable substituents (per claims 11 and 12) or blend to balance the hydrocarbon character and crosslink density to ultimately control the absorption rate of the receiving layer which would have included an a ratio of silicon alkoxide only having hydrolyzable substituents to silicon alkoxide

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having a non-hydrolyzable substituents between 0.1-10 in moles silicon as claimed by the applicant (per claim 13).

9. **Regarding Claim 17**, Lui discloses the use of tetraethyl orthosilicate in the preparation of aluminosilicate (column 23, lines 12-25).

10. **Regarding Claim 18**, Lui discloses polyvinyl alcohol as a binder for the recording media (column 8, line 33).

11. **Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lui (6548149) in view of Totani (US 20010009712).**

12. **Regarding Claims, 14-16**, Lui teaches the recording element that contains silicon alkoxide compounds but fails to mention the specific compounds claimed by the applicant.

Totani discloses silicon alkoxide compounds having a non-hydrolyzable substituents commonly in receiving layer of ink jet recording mediums that includes methyltrimethoxysilane (alkyl group 1 carbon) and vinyltriethoxysilane (paragraph 46).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to have selected from known silicon alkoxide compounds having a non-hydrolyzable substituents such as those disclosed by Totani that read on the applicants' claimed compounds, absent unexpected results.

Response to Arguments

The applicant argues that the hybrid aluminosilicate polymer is obtained by a specified preparation method.

The examiner counters that the claims are drawn to an ink jet recording element not a method of making an element.

The applicant argues that Lui only teaches hydrolysable substituents but not non-hydrolyzable.

The examiner agrees with the applicants' assessment of Lui. However, the examiner takes the position that the usage of hydrolyzable, non-hydrolyzable substituents or blend since it is known in the art as disclosed by Totani and the nature of the R group in $RZ(OR')_3$ (where Z = Si or Al) with more hydrocarbon character increases the affinity of a material towards organic medium. Graziano discloses that compounds with higher hydrocarbon content translates in higher solubility in organic solvents. While Graziano is not directed toward an ink jet element, the effect of high hydrocarbon character on organic solubility was clearly presented. Given that a host of ink jet inks are organic solvent based, increasing the affinity of an ink jet medium for organic solvent based ink would be desirable and increase the hydrocarbon content of the medium would be an obvious way to achieve this goal.

The applicant indicates in the specification that non-hydrolyzable substituents give the aluminosilicate more organophilic character but there are not specific attributes that would render the use of non- hydrolyzable substituents as non-obvious.

A person of ordinary skill in the art at the time of the invention would have selected from known materials with hydrolyzable and non- hydrolyzable substituents.

The applicant's arguments with respect to claims 1-18 have been considered but are moot in view of the new grounds of rejection.

Conclusion

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on (571) 272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. Lawrence Tarazano/
Supervisory Patent Examiner, Art Unit 1786

GREGORY CLARK/GDC/
Examiner

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